

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA8 | The Chalfonts and Amersham

Baseline (SV-002-008)

Sound, noise and vibration

November 2013

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Department
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1 Introduction

1.1 Structure of the sound, noise and vibration appendices

- 1.1.1 The sound, noise and vibration appendices comprise four sections. The first of these is an introduction to the relevant policy and methodology (Volume 5: Appendix SV-001-000). This relates to the sound, noise and vibration assessment for all community forum areas (CFA).
- 1.1.2 For The Chalfonts and Amersham area, the other three sections are as follows:
- baseline sound, noise and vibration (Volume 5: Appendix SV-002-008) (this appendix);
 - construction sound, noise and vibration (Volume 5: Appendix SV-003-008); and
 - operational sound, noise and vibration (Volume 5: Appendix SV-004-008).
- 1.1.3 Maps referred to within this appendix are contained in the Volume 5, Sound, Noise and Vibration Map Book.
- 1.1.4 This appendix includes details of the existing and future baseline sound environment within the area. It provides details of measurements and any other data collection which has been undertaken in order to obtain existing and future baseline sound levels.

1.2 Existing acoustic environment

- 1.2.1 The existing baseline sound environment for this area is varied. The Proposed Scheme is entirely in tunnel through this area and therefore baseline sound measurements have mainly been focused around the three tunnel ventilation and intervention shafts (vent shafts) located in the area.
- 1.2.2 In the south-east of this area, to the north-east of Chalfont St Peter, the dominant sound source is constant road traffic on the M25 motorway. Other audible sources of sound include intermittent traffic on local roads and natural sources.
- 1.2.3 At locations close to the Chalfont St Peter vent shaft the main sound sources are regular cars passing nearby on Chesham Lane, with typical day time sound levels of approximately 55 to 60dB¹ at properties on Chesham Lane.
- 1.2.4 The Chalfont St Giles vent shaft is located in a rural area away from major roads, typical daytime sound levels in this area are approximately 45 to 50dB¹. The main sources of sound audible in the area include trees rustling in the breeze and occasional birdsong. The sound of infrequent aircraft over flight is also audible.
- 1.2.5 In the area surrounding the Amersham vent shaft the main sound source is road traffic on the nearby busy A413 and A404 roads and intermittent local traffic on Whielden Lane, with typically sound levels during the day of approximately 65dB¹.

¹ Quoted dB values at residential areas refer to the free-field 16 hour daytime (07:00 to 23:00) equivalent continuous sound pressure level, L_{pAeq,16hr}.

- 1.2.6 Sound levels in this area reduce during the night-time period due to the reduction in traffic movements on local roads. Consequently, night-time noise levels are typically between 5 and 10 dB² below daytime levels, with the lower reductions applying in quiet locations distant from existing road traffic.

² Night-time sound levels refer to the free-field 8 hour night-time (23:00 to 07:00) equivalent continuous sound pressure level, $L_{pAeq,8hr}$.

2 Scope, assumptions and limitations

2.1 Sound and vibration sensitive receptors

2.1.1 Within The Chalfonts and Amersham area, 12 assessment locations have been defined to represent all identified relevant sound and vibration sensitive receptors within the spatial scope. The assessment locations are shown on the detailed maps in Map Series SV-03 and SV-04 (Volume 5, Sound, Noise and Vibration Map Book). Within this area, the following types of sound and vibration sensitive receptors have been identified:

- residential areas;
- education facilities;
- community centres and meeting facilities;
- places of worship; and
- healthcare facilities.

2.2 Local engagement

- 2.2.1 Discussions have been held with representatives of Chiltern District Council regarding the approach which has been taken to baseline monitoring within this area, the identification of noise and vibration sensitive receptors, the selection of assessment locations and baseline sound levels at these assessment locations.
- 2.2.2 Changes suggested during these meetings have influenced the assessment locations used and the monitoring undertaken and reported in this document.
- 2.2.3 Representatives of Chiltern District Council have also attended baseline sound measurements in this area and witnessed the measurement procedures used.
- 2.2.4 Local engagement through community forum meetings has also provided the opportunity for local groups to suggest appropriate baseline sound monitoring locations. Any suggestions received from these groups have been considered and influenced the monitoring undertaken and reported in this document

2.3 Existing baseline sound monitoring locations

- 2.3.1 Maps showing the baseline sound monitoring locations and assessment locations within this area are included in Map Series SV-03 and SV-04 (Volume 5, Sound, Noise and Vibration Map Book).

3 Environmental baseline

3.1 Existing baseline data collection methodology

- 3.1.1 The overall approach to baseline data collection for sound, noise and vibration is described in Volume 5: Appendix SV-001-000.
- 3.1.2 Over The Chalfonts and Amersham area, a number of baseline sound measurements have been undertaken. These have been classified as follows:
- Long-term measurements – unattended measurements of several days duration ;
 - medium-term measurements – attended measurements of several hours duration (generally repeated at different times of day); and
 - short-term measurements – attended measurements typically of 30 minutes duration (generally repeated at different times of day).
- 3.1.3 The whole of the Proposed Scheme in this area is in tunnel and therefore measurements were primarily undertaken at vent shaft locations.
- 3.1.4 In this CFA a total of three baseline sound level measurements have been undertaken.
- 3.1.5 To the north of Chalfont Common and east of the A413, a single short-term measurement was undertaken on Chesham Lane, close to the location of the Chalfont St Peter vent shaft.
- 3.1.6 To the north-west of Chalfont St Giles, a single short-term measurement was undertaken on Bottom House Farm Lane, close to the location of the Chalfont St Giles vent shaft.
- 3.1.7 In the area south of Amersham Old Town, a single short-term measurement was undertaken on Whielden Lane, close to the location of the Amersham vent shaft.

3.2 Existing baseline sound levels

- 3.2.1 From the measurements described in Section 3.1, baseline sound levels have been ascertained for each assessment location within this area. These levels are presented in terms of the following key sound indicators:
- For the operational sound assessment
 - $L_{pAeq,16hr\text{ weekday}}$ daytime (07:00-23:00) sound pressure level;
 - $L_{pAeq,8hr\text{ weekday}}$ night-time (23:00-07:00) sound pressure level;
 - arithmetic average of $L_{pAFmax,5min}$ night-time sound pressure level; and
 - highest $L_{pAFmax,5min}$ night-time sound pressure level.
 - For the construction sound assessment
 - daytime L_{pAeq} sound pressure level (Monday to Friday 07:00-19:00; Saturday 07:00-13:00);
 - evening/weekend L_{pAeq} sound pressure level (Monday to Friday 19:00-23:00; Saturday

13:00- 23:00; Sunday 07:00 to 23:00); and

- night-time L_{pAeq} sound pressure level (Monday to Sunday 23:00-07:00)

3.2.2 These values are presented in Table 1. The data source coding included within this table details how the baseline sound levels allocated to each assessment location have been derived. This coding is summarised in Table 2 and explained in detail in Volume 5: Appendix SV-001-000.

Appendix SV-002-008

Table 1: Existing baseline sound levels

Assessment location ID	Area Represented	Measurement location	Existing baseline sound level (dB)							Data source coding
			For operational sound assessment				For construction sound assessment			
			Daytime L _{pAeq,16hr}	Night-time L _{pAeq,8hr}	Arithmetic average of night-time L _{pAFmax,5min}	Highest night-time L _{pAFmax,5min}	Daytime L _{pAeq}	Evening/weekend L _{pAeq}	Night-time L _{pAeq}	
392953	Chalfont Lane, West Hyde	CS3001	70.9	63.7	71.6	75.6	71.5	68.5	63.7	4,C,ii,b
394598	West Hyde Lane, Chalfont St. Peter	LM5113	61.4	53.7	57.5	68.5	61.9	60.9	53.8	3,A,iii,b
394612	Roberts Lane, Chalfont St. Peter	LM5113	61.4	53.7	57.5	68.5	61.9	60.9	53.8	3,A,iii,b
394900	Roberts Lane, Chalfont St. Peter	LM5113	61.4	53.7	57.5	68.5	61.9	60.9	53.8	3,A,iii,b
395087	Shire Lane, Chalfont St Peter	LM5113	61.4	53.7	57.5	68.5	61.9	60.9	53.8	3,A,iii,b
700476	Chesham Lane, Chalfont St. Giles	CS1402	47.3	40.1	68.3	72.3	47.3	44.9	40.1	4,C,ii,b
700484	Turners Wood Drive, Chalfont St. Giles	CS1402	45.9	39.2	68.3	72.3	45.9	39.2	39.2	4,D,iii,b
700485	Whielden Heights, Amersham	CS1406	65.0	57.8	68.0	72.0	65.6	62.6	57.8	4,A,iii,b
700486	Bottom House Lane, Chalfont St. Giles	CS1405	45.8	37.2	46.6	50.2	46.2	43.8	37.2	4,A,i,a
700487	Bottom House Lane, Chalfont St. Giles	CS1405	45.8	37.2	46.6	50.2	46.2	43.8	37.2	4,A,i,a
700488	Whielden Heights, Amersham	CS1406	65.0	57.8	68.0	72.0	65.6	62.6	57.8	4,A,ii,b
700492	Chesham Lane, Chalfont St. Peter	CS1402	57.3	50.1	68.3	72.3	57.3	54.9	50.1	4,A,i,a

Table 2: Data source coding key

Code	Data source type
1	Long-term measurement location
2	Short-term (linked to simultaneous long-term)
3	Short-term (using profile from non-simultaneous long-term)
4	Short-term using standard (National Noise Incidence Study ³ or other) 24hr profile
5	Specific validated prediction
6	Predictions from other sources (Department of Environment, Food and Rural Affairs (Defra) noise maps ⁴ , etc.)
7	Generic levels

Code	Corrections applied
A	Data from above source applied directly
B	Correction applied for screening
C	Correction applied for distance from source
D	Minimum level cut-off applied

Code	Distance from measurement
i	Data applied from a measurement at or very close to the assessment location.
ii	Data applied from a local measurement location at a greater distance but noted to have equivalent acoustic climate.
iii	Data applied from a distant measurement location where sound levels would be expected to be similar.

Code	Uncertainty
a	Data are considered highly representative of the prevailing sound climate.
b	Data are considered representative of the prevailing sound climate, but variations in measured levels indicate that there may be a higher degree of uncertainty than for (a).
c	Data are considered to be an estimate of the sound climate, (e.g. taken from Defra noise maps, etc.).

³ Building Research Establishment (2002), *National Noise Incidence Study*, 2000/2001.⁴ Defra; Noise Mapping England; <http://services.defra.gov.uk/wps/portal/noise/>; Accessed: 26 July 2013.

3.3 Future baseline methodology

Construction

- 3.3.1 The assessment of noise from construction activities assumes a baseline year of 2017. As a conservative assumption, it has been assumed that no change in baseline sound levels will occur between the existing baseline (2012/13) and the future baseline year of 2017.
- 3.3.2 Due to the duration of the construction work and as the precise timing of the highest sound levels would be different in each location, using baseline sound levels for 2017 as the start of the construction period, provides a reasonable worst case assessment.
- 3.3.3 The assessment of construction traffic is based on future baseline traffic flows for 2021, as a year representative of the middle of the construction period.

Operation

- 3.3.4 There is potential for future baseline sound levels for operation (2026) to change when compared to the existing baseline sound levels (2012) as a result of changes in baseline sound sources.
- 3.3.5 In the vast majority of cases where change might occur it is expected that baseline sound levels will increase at assessment locations due to increases in vehicle movements on roads. It is therefore considered that the use of the 2012 baseline levels in the operational assessment will result in a worst case assessment of the impact of changes in the future baseline sound levels in the majority of locations.
- 3.3.6 Therefore for the purposes of this assessment future baseline levels have been assumed to be identical to those identified in Table 1 of this appendix for 2012.
- 3.3.7 In addition, based on available road traffic information a screening exercise has been undertaken to identify any areas in which a reduction in baseline sound level might be likely. Where reductions in baseline sound level have been identified a further screening assessment has been completed to identify if these changes would be likely to materially affect the operational sound assessment.
- 3.3.8 The screening assessment has not identified any locations in this area where a decrease in future baseline (2026), compared to existing baseline (2012), is likely to materially affect the operational sound assessment.

4 References

Building Research Establishment (2002), *National Noise Incidence Study*, 2000/2001.

Defra; Noise Mapping England; <http://services.defra.gov.uk/wps/portal/noise/>; Accessed: 26 July 2013.